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Fact Sheet

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ToxFAQs ™

Sodium Hydroxide

Source: Agency for Toxic Substances and Disease Registry
Centers for Disease Control and Prevention
http://www.atsdr.cdc.gov/tfacts178.html

This fact sheet answers the most frequently asked health questions about sodium hydroxide. For more information, you may call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. This information is important because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Sodium hydroxide is a manufactured chemical. It is present in several domestic cleaning products. Very low levels can produce irritation of the skin and eyes. Exposure to the solid or concentrated liquid can cause severe burns in the eyes, skin, and gastrointestinal tract, which may ultimately lead to death. This substance has been found in at least 49 of the 1,585 National Priorities List sites identified by the Environmental Protection Agency (EPA).

What is sodium hydroxide?

At room temperature, sodium hydroxide is a white crystalline odorless solid that absorbs moisture from the air. It is a manufactured substance. When dissolved in water or neutralized with acid it liberates substantial heat, which may be sufficient to ignite combustible materials. Sodium hydroxide is very corrosive. It is generally used as a solid or a 50 percent solution. Other common names include caustic soda and lye.

Sodium hydroxide is used to manufacture soaps, rayon, paper, explosives, dyestuffs and petroleum products. It is also used in processing cotton fabric, laundering and bleaching, metal cleaning and processing, oxide coating, electroplating, and electrolytic extracting. It is commonly present in commercial drain and oven cleaners.

What happens to sodium hydroxide when it enters the environment?

- Sodium hydroxide released to the atmosphere breaks down readily by reacting with other chemicals.

- Sodium hydroxide separates in water to sodium cations (positively charged sodium atoms) and hydroxide anions (negatively charged oxygen and hydrogen atoms), which ultimately decrease the acidity of the water.
- If released to soil, sodium hydroxide will separate into sodium cations and hydroxide anions when it comes into contact with moisture.
- Sodium hydroxide does not accumulate in the food chain.

How might I be exposed to sodium hydroxide?

- Small amounts of sodium hydroxide are sometimes used in drain and oven cleaners. Using these products may expose you to sodium hydroxide.
- Workers employed in industries where sodium hydroxide is produced or used may be exposed to this compound.

How can sodium hydroxide affect my health?

Sodium hydroxide is very corrosive and can cause severe burns in all tissues that come in contact with it. Inhalation of low levels of sodium hydroxide as dusts, mists or aerosols may cause irritation of the nose, throat, and respiratory airways. Inhalation of higher levels can produce swelling or spasms of the upper airway leading to obstruction and loss of measurable pulse; inflammation of the lungs and accumulation of fluid in the lungs may also occur.

Ingestion of solid or liquid sodium hydroxide can cause spontaneous vomiting, chest and abdominal pain, and difficulty swallowing. Corrosive injury to the mouth, throat, esophagus, and stomach is very rapid and may result in perforation, hemorrhage, and narrowing of the gastrointestinal tract. Case reports indicate that death results from shock, infection of the corroded tissues, lung damage, or loss of measurable pulse.

Skin contact with sodium hydroxide can cause severe burns with deep ulcerations. Pain and irritation are evident within 3 minutes, but contact with dilute solutions may not cause symptoms for several hours. Contact with the eye may produce pain and irritation, and in severe cases, clouding of the eye and blindness.

Long-term exposure to sodium hydroxide in the air may lead to ulceration of the nasal passages and chronic skin irritation

We do not know if exposure to sodium hydroxide could affect reproduction in humans.

How likely is sodium hydroxide to cause cancer?

There have been reports of cancer of the esophagus 15 to 40 years after the formation of narrow points caused by corrosion induced by sodium hydroxide. However, these cancers were most likely the result of tissue destruction and scar formation rather than a direct carcinogenic action of sodium hydroxide itself.

The Department of Health and Human Services (DHHS), the International Agency for Research on Cancer (IARC), and the EPA have not classified sodium hydroxide for carcinogenicity in humans.

Some reports indicate that cancer of the esophagus may develop many years after exposure to sodium hydroxide levels that are high enough to cause tissue damage. But this does not mean that sodium hydroxide itself is a cancer agent. The cancer could have arisen during repair of the damaged tissue.

How does sodium hydroxide affect children?

There are no studies on the health effects of children exposed to sodium hydroxide. The effects seen in children accidently exposed to sodium hydroxide are similar to the effects observed in adults.

We do not know if exposure to sodium hydroxide can result in birth defects or other developmental effects in people.

How can families reduce the risk of exposure to sodium hydroxide?

Products containing sodium hydroxide should be stored out of the reach of children.

Cleaners containing sodium hydroxide should not be stored in containers that may appear attractive to children, such as soda bottles.

Is there a medical test to show whether I've been exposed to sodium hydroxide?

There are no clinical tests that show that you have been exposed to sodium hydroxide.

Has the federal government made recommendations to protect human health?

The Occupational Safety and Health Administration (OSHA) sets a limit of 2 milligrams of sodium hydroxide per cubic meter of air (2 mg/m^3) in the workplace for an 8-hour work shift, 40-hour work week.

The Food and Drug Administration (FDA) allows sodium hydroxide as a food additive in levels not to exceed 1 percent.

Where can I get more information?

ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

For more information, contact:

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